New Course:

AMES 207 (Winter 98)

NONLINEAR SYSTEMS

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Course Objective: The course will give the students an in-depth introduction to stability and other analysis techniques for nonlinear systems and prepare them for a course on Nonlinear Control Design to be offered in the Spring 98 quarter. Students from all departments are welcome.

Topics: Existence and uniqueness of solutions of ODE's, sensitivity equations. Stability, direct and converse Lyapunov theorems, LaSalle's theorem, linearization, invariance theorems. Center manifold theorem. Stability of perturbed systems with vanishing and nonvanishing perturbations, input-to-state stability, comparison method. Input-output stability. Perturbation theory and averaging. Singular perturbations. Circle and Popov criteria, small gain theorem, passivity. Describing functions.

Texts: H. Khalil, *Nonlinear Systems,* 2nd ed, Prentice Hall, 1995, ISBN 0471127329

Prerequisite: Linear systems theory

Time and Place: TTH 5:30-6:50, CENTR 206

Office Hours: M 5-6 or by appointment (e-mail, phone)

Grading: 35% homework, 30% midterm, 35% final